

## **CLIMATE NARRATIVE, September 2018 (and as noted)**

### **WEST COAST OF UNITED STATES AND NORTH PACIFIC**

In late September, coastal (10-250 km offshore) sea surface temperature (SST) gradients tended to be less extreme, on average, than they had been in August. Most of the Southern California bight (SCB) dropped into the 19°-22°C SST range, while the coastal SST between Point Reyes and Vancouver Island remained between 13°-15°C. North of Cape Mendocino, warmer offshore water (15°-18°C) was found within 40-100 km of the coast. Coastal SST between 14° and 18°C occurred between Point Conception and San Francisco. SST anomalies to 2°C persisted in parts of the SCB, along the coast of northern Mexico and 30-100 km off northern California. Areas of weak negative SST anomaly (< -1.5°C) spread from 100-300 km off the west coast to the south west and west as far as 180°E/W. Much of the Pacific north of 40°N had weakly positive temperature anomalies. [https://coastwatch.pfeg.noaa.gov/el\\_nino/coastal\\_conditions.html](https://coastwatch.pfeg.noaa.gov/el_nino/coastal_conditions.html)

Positive **SEA LEVEL ANOMALY** (SLA), to 20 centimeters (cm,) was seen in the western Pacific north of 20°N, along the coast of Central America (5°N-20°N) and across the western equatorial Pacific.

<http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/>

[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ocean/weeklyenso\\_clim\\_81-10/wksl\\_anm.gif](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif)

[http://agate.coas.oregonstate.edu/data/sst\\_codar\\_3day.html](http://agate.coas.oregonstate.edu/data/sst_codar_3day.html)[http://agate.coas.oregonstate.edu/data/sst\\_codar\\_3day.html](http://agate.coas.oregonstate.edu/data/sst_codar_3day.html)

During September, chlorophyll-a (Chl-a) at 2-4 milligrams per cubic meter (mg/m<sup>3</sup>) occurred in 200-400 km wide coastal areas off Central California and Vancouver Island. Greater Chl-a concentrations were found along the coasts of Northern California, Oregon, Washington and Vancouver Island in bands less than 50 km wide. Lower Chl-a water (0.3-1.0 mg/m<sup>3</sup>) was found within 100 km of shore off northern California, northern Oregon and southern Washington.

<https://coastwatch.pfeg.noaa.gov/coastwatch/CWBrowserWW180.jsp#>

At the **CAPE SAN MARTINE DATA BUOY** (46028), off Central California (35.7°N), the maximum monthly mean temperature of 15.1-15.3°C occurs in September. Average SST for 1-10, 10-20, 20-30 and 30 September 2018 was 16.0°, 14.8°, 15.6° and 16.3°C, respectively. At the **TILLIMOOK DATA BUOY** (46082), 85 nautical miles WNW of Tillamook, OR (46°N), maximum monthly mean SST (16.9-17.1°C) occurs in August and September. Mean SST was 17.5°, 17.2°, 16.7° and 16.5°C on 1-10, 10-20, 20-30, 30 September 2018, respectively.

### **WATER TEMPERATURES AT SHORE STATIONS**

At the Scripps Institution of Oceanography (SIO) Pier at **LA JOLLA** (32.9°N), the SST diverged sharply from the historical mean in June, was equal or exceeded historical extremes in July and August and dropped back to average conditions (20.3°-20.9°C) in September. October 1st SST was 20.7°C and the bottom temperature was 19.9°C.

<https://scripps.ucsd.edu/programs/shorestations/>

At the **PORT ORFORD** tide station (42.7°N), subtidal water temperature ranged from 8.7° to 12.4°C during September.

<https://tidesandcurrents.noaa.gov/stations.html?type=Physical+Oceanography>

## **EQUATORIAL AND SOUTH PACIFIC CONDITIONS**

El Niño-Southern Oscillation (ENSO)-neutral conditions persisted through September and are expected through boreal winter. Neutral to positive SST anomalies persisted across Equatorial and northern tropical Pacific. Upper ocean (0-300m) heat content anomaly from 180-100°W increased through September. Positive sea level anomalies (SLA) to 20 cm occurred across the equatorial Pacific from 140°E to 100°W, extending to 10°S at 160°E. The seemingly coupled trough of negative SLA had zonal axis near 10°N. The eastern south Pacific had neutral to negative SLA.

The **NOAA OCEANIC EL NIÑO INDEX (ONI)** [3-month running mean of ERSST.v4 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)] was neutral (0.1) for the fourth consecutive month (JAS).

[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/lanina/enso\\_evolution-status-fcsts-web.pdf](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf)

The **NOAA / NCEI PACIFIC DECADEAL OSCILLATION INDEX (PDO)**, calculated from ERSST.v4 data, has recently had eight consecutive weakly negative values, including -0.42 for September [ <https://www.ncdc.noaa.gov/teleconnections/pdo/> ]

During September 2018 the Bakun **ERD UPWELLING INDEX (UI)**, computed from monthly average sea level atmospheric pressure fields, indicated continuation of robust upwelling conditions from 33° to 39°N, with strongly positive UI anomalies.

<http://www.pfeg.noaa.gov/products/PFELData/upwell/monthly/table.1809>

## **PRECIPITATION and RUNOFF**

Rainfall in the Pacific Northwest and southwestern Canada was 20 – 60% of average during June-September. The **Fraser River**, measured at Hope (130 km upstream from Vancouver, B.C.), was flowing at about 55,000 cubic feet per second (cfs), 40-60% less than median-range discharge in September.

<http://www.pac.dfo-mpo.gc.ca/science/habitat/frw-rfo/reports-rapports/2018/2018-08-27/2018-08-27-eng.pdf> The **Columbia River** was flowing at 75,000 [102,000] cfs at The Dalles, OR. The **Sacramento River** was transporting 14,800 [11,400] cfs at Verona.

<https://waterdata.usgs.gov/ca/nwis/current/?type=flow>

## **BIOLOGICAL OBSERVATIONS and NOTES**

In September rockfish were feeding on **Pleuroncodes planipes** off central California.

The majority of the fall **Chinook Salmon** run past the Bonneville Fishway on the Columbia River during September. Adult fall-run returns were 59% of last year and 35% of the ten-year average.

[http://www.fpc.org/web/apps/adultsalmon/R\\_yearodatecomparisontable\\_results.php](http://www.fpc.org/web/apps/adultsalmon/R_yearodatecomparisontable_results.php)

The largest **California** population of naturally reproducing **Spring Chinook** returns to Butte Creek off the Sacramento River and Mill and Deer Creeks in adjacent Tehama County. The largest part of this population currently returns to Butte Creek, where a

recent snorkel survey counted 2,118 Chinook. This is more than in 2010, 2015 and 2017, but only 12% of the largest recent return in 2012.

<https://www.wildlife.ca.gov/conservation/watersheds/instream-flow/studies/butte-creek-study>  
<http://www.buttecreek.org>

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